

Sustainable Stormwater: Restoring Native Hydrology

Ford Plant, St. Paul



Ford Task Force

May 2, 2011

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The Ford Plant has a rich history and contributes to a vibrant neighborhood

Part of Highland Park Neighborhood
since 1924

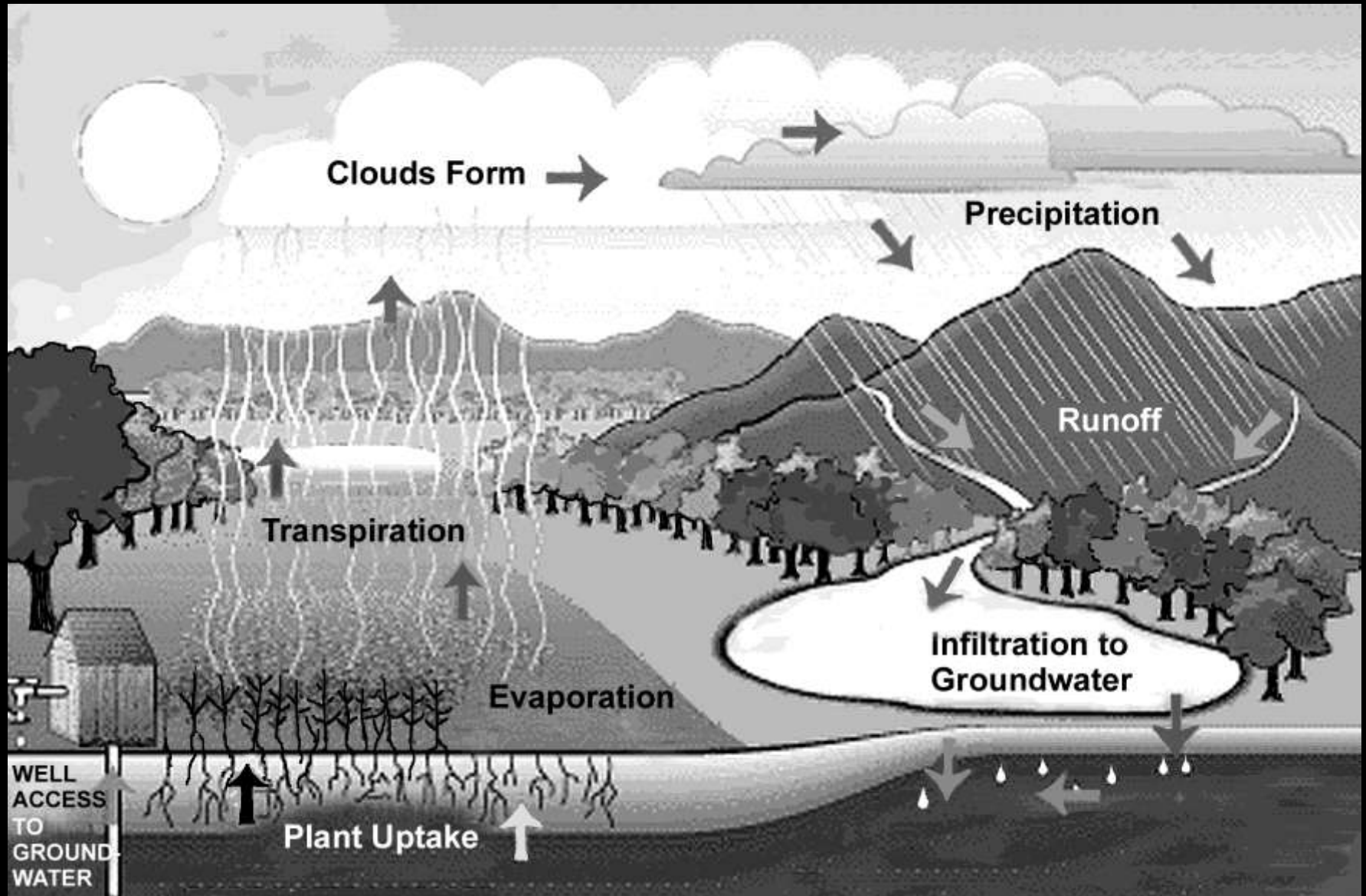


The Ford Plant has a rich history and contributes to a vibrant neighborhood

Located along Mississippi River Gorge



Hydrology 101



Hydrology 101

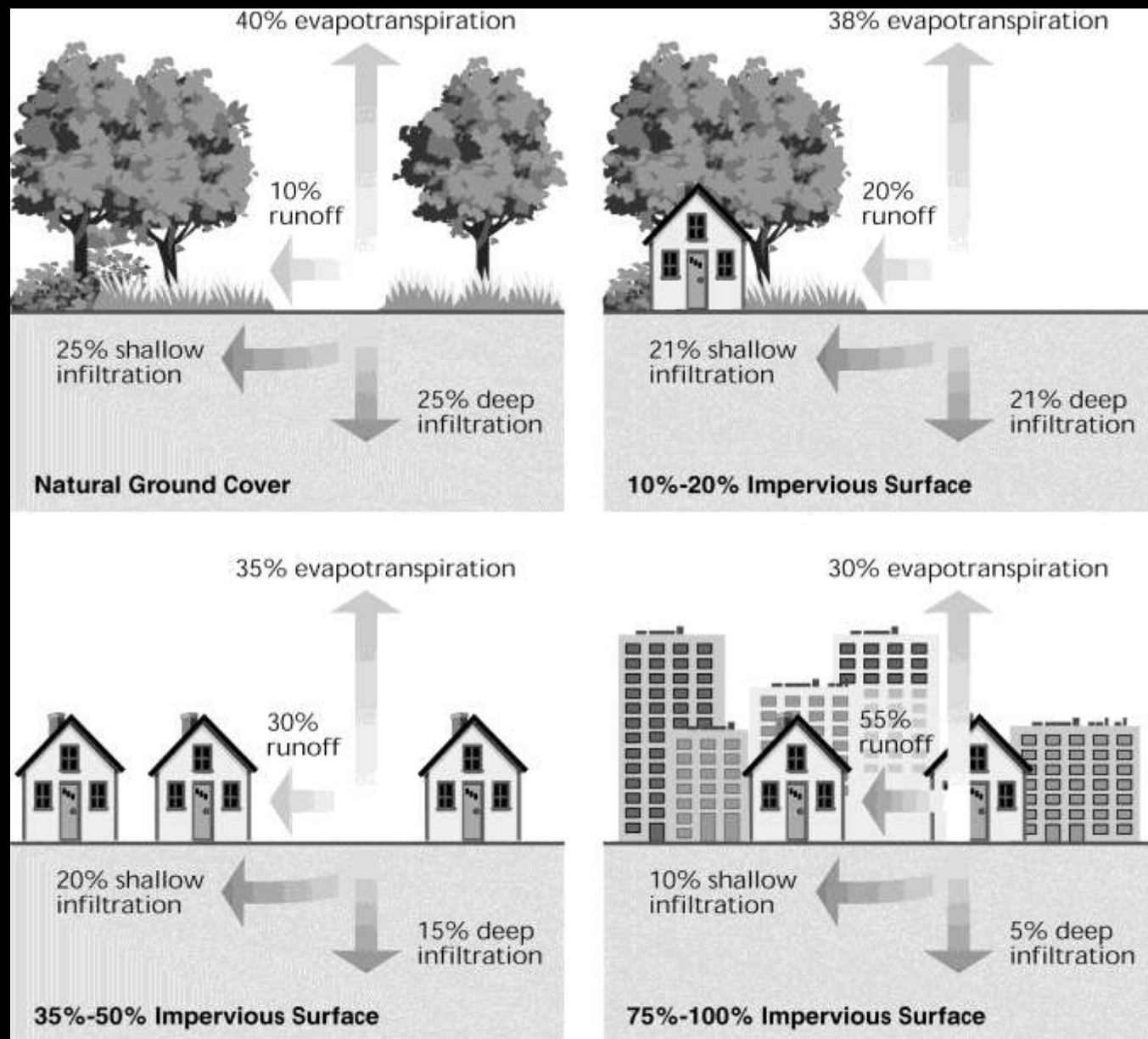


Fig. 3.21 -- Relationship between impervious cover and surface runoff. Impervious cover in a watershed results in increased surface runoff. As little as 10 percent impervious cover in a watershed can result in stream degradation.

In Stream Corridor Restoration: Principles, Processes, and Practices (10/98).

By the Federal Interagency Stream Restoration Working Group (FISRWG) (15 Federal agencies of the U.S.)

Redevelopment of Ford Plant offers opportunities for water quality improvement



Redevelopment of Ford Plant offers opportunities for water quality improvement

85% Impervious!



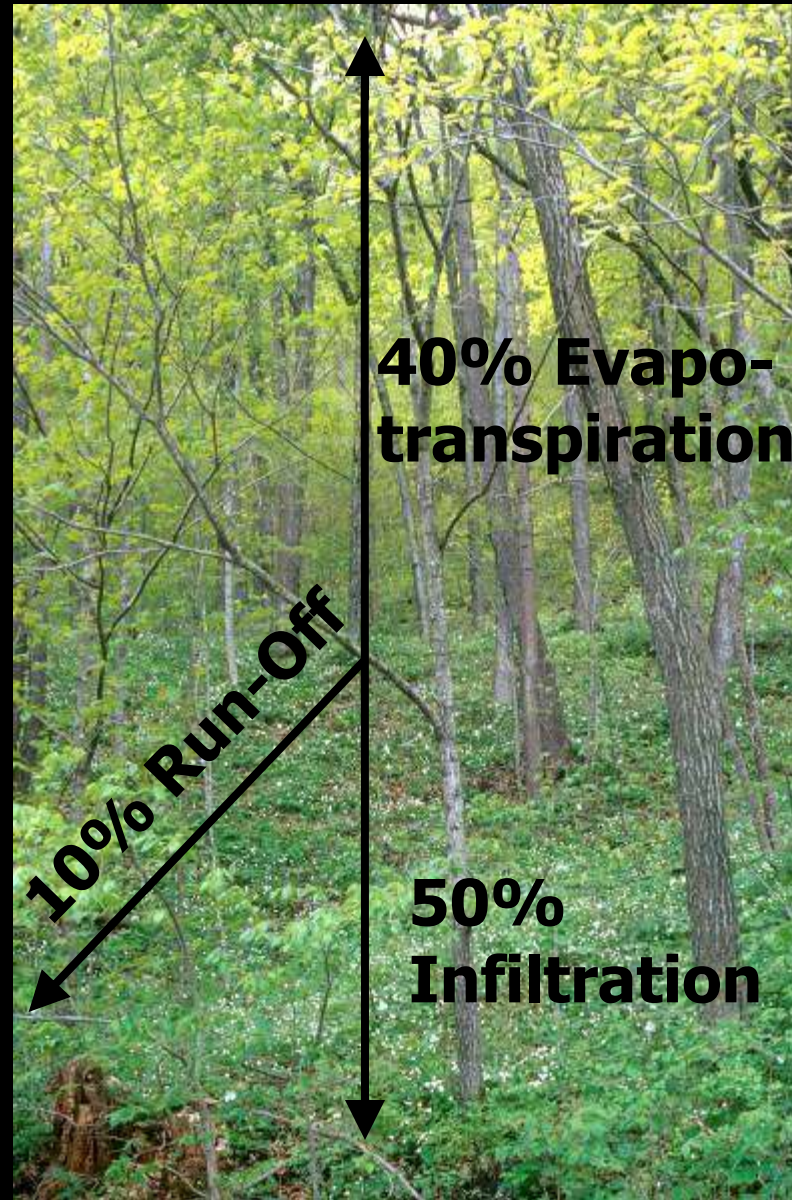
Impacts of Stormwater Runoff



Impacts of Stormwater Runoff



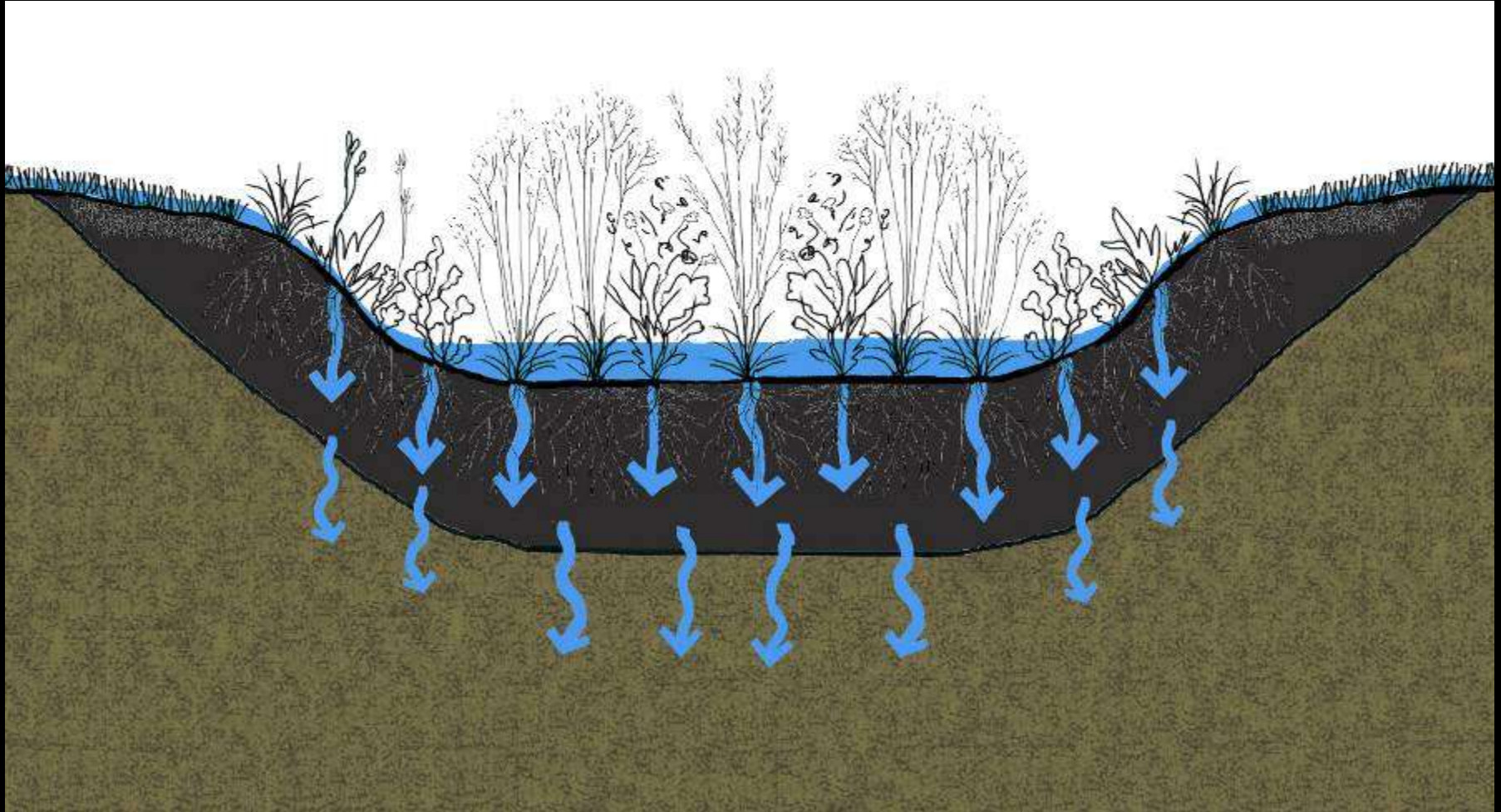
Restoring Native Hydrology



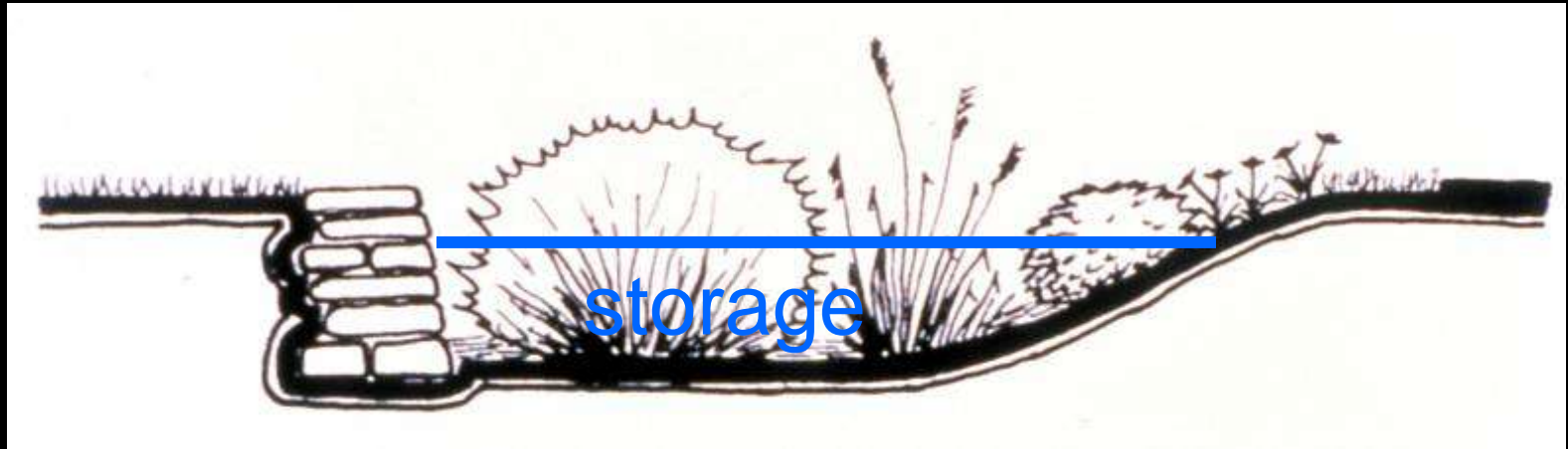
Restoring Native Hydrology through Impervious Surface Reduction



Restoring Native Hydrology with Infiltration



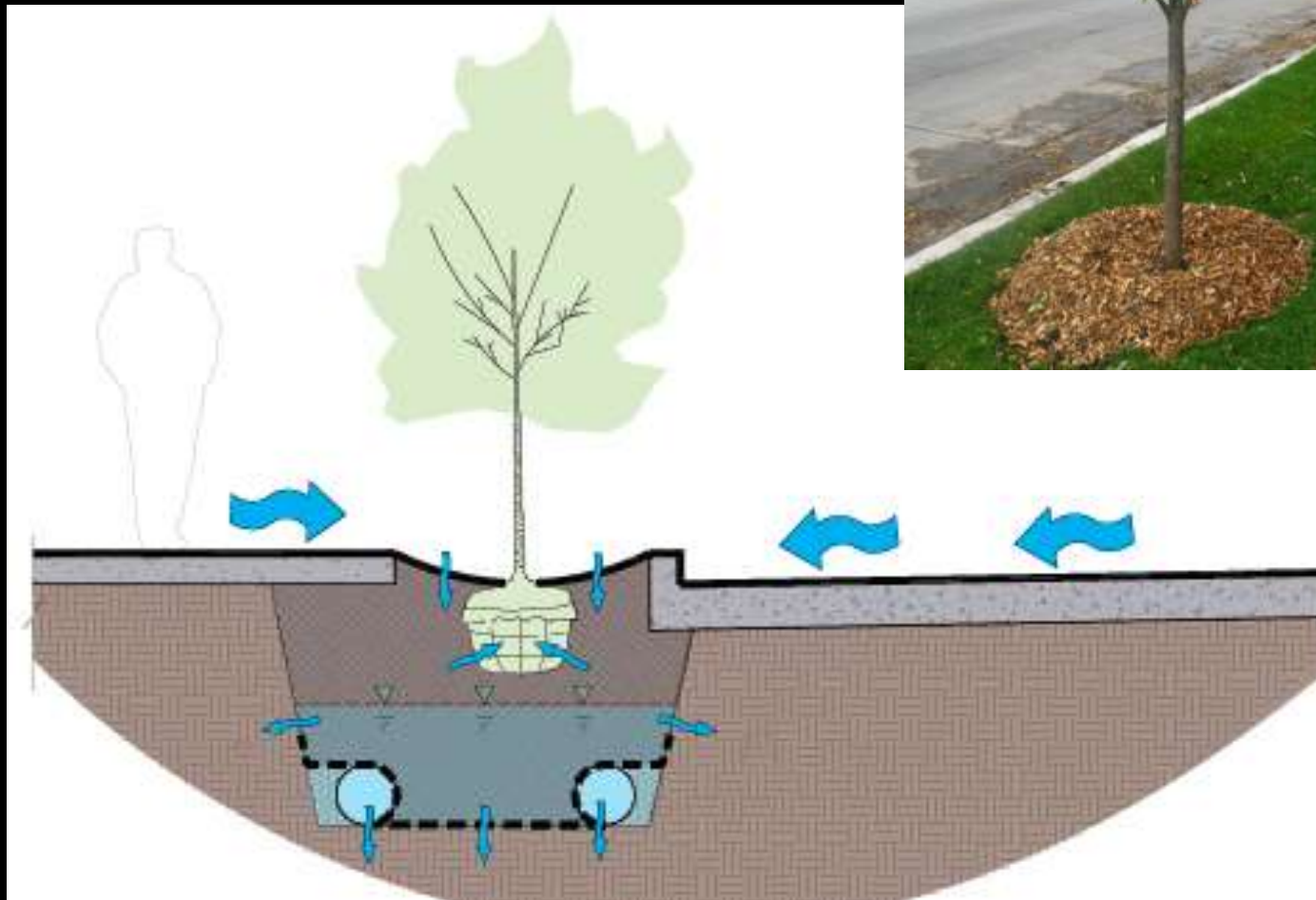
Restoring Native Hydrology with Infiltration



Restoring Native Hydrology with Infiltration



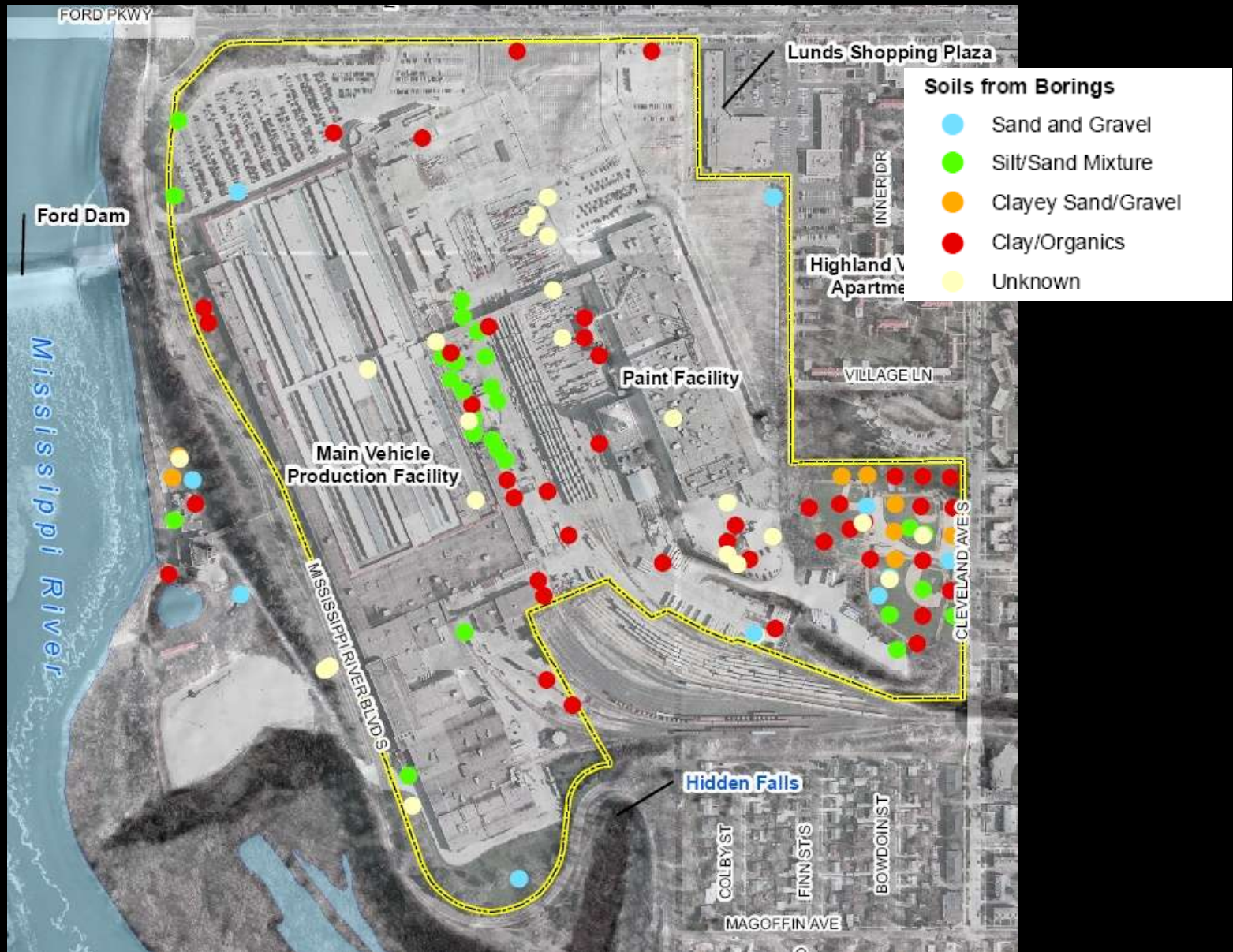
Restoring Native Hydrology with Infiltration



Ford Site presents challenges to infiltration

- Impermeable Soils
- Shallow Bedrock
- Perched Groundwater
- Contaminated Soils

Soil borings show low permeability soils



A photograph of a geological outcrop with a waterfall on the right side. The outcrop shows distinct horizontal layers of rock. A red vertical line with arrows at the top and bottom, and horizontal tick marks, spans the height of the main rock face. Labels with red arrows point to specific layers. The waterfall is on the right, cascading over the rock face.

Permeable Magnolia Member

**Low Permeable
Hidden Falls Member**

**Platteville Limestone
Formation**

Glenwood Shale

**St. Peter Sandstone
Formation**

Contaminated Soil is Present Onsite

- Concentrations evaluated against Industrial SRVs
- May need to consider other standards (residential, recreational, or leaching)
- Future site use may be restricted by remaining contamination levels



Contaminated soil management for stormwater features:

- State rules require proper management of contaminated soils
- No water infiltration through soil contamination (may need to consider top of bedrock contamination)
- Management options:
 - Adjust pond location
 - Excavate soil in infiltration areas
 - Line infiltration ponds

Successful Integration: Northwest Quadrant

- 100-acre heavy industrial (asphalt plant, dumps, refinery, solvent recycling, petroleum releases, etc.)
- Orchestrated concurrent environmental investigation and cleanup, wetland evaluation, civil design, and stormwater planning
- Implemented a complex stormwater plan allowing for phased cleanup and development
- Improved stormwater quality and reduction of impacts to nearby lakes



Conservation Design Process helps identify locations for infiltration



Filtration can be used where site constraints prevent infiltration

- Filtration BMPs can use infiltration methods, with an underdrain
- Limited water quantity reduction benefit
- New technologies allow over 70% of pollutant removal
- Bring baseflow to Hidden Falls

Connectivity

- Social/Economic
- Ecological/Habitat
- Recreational

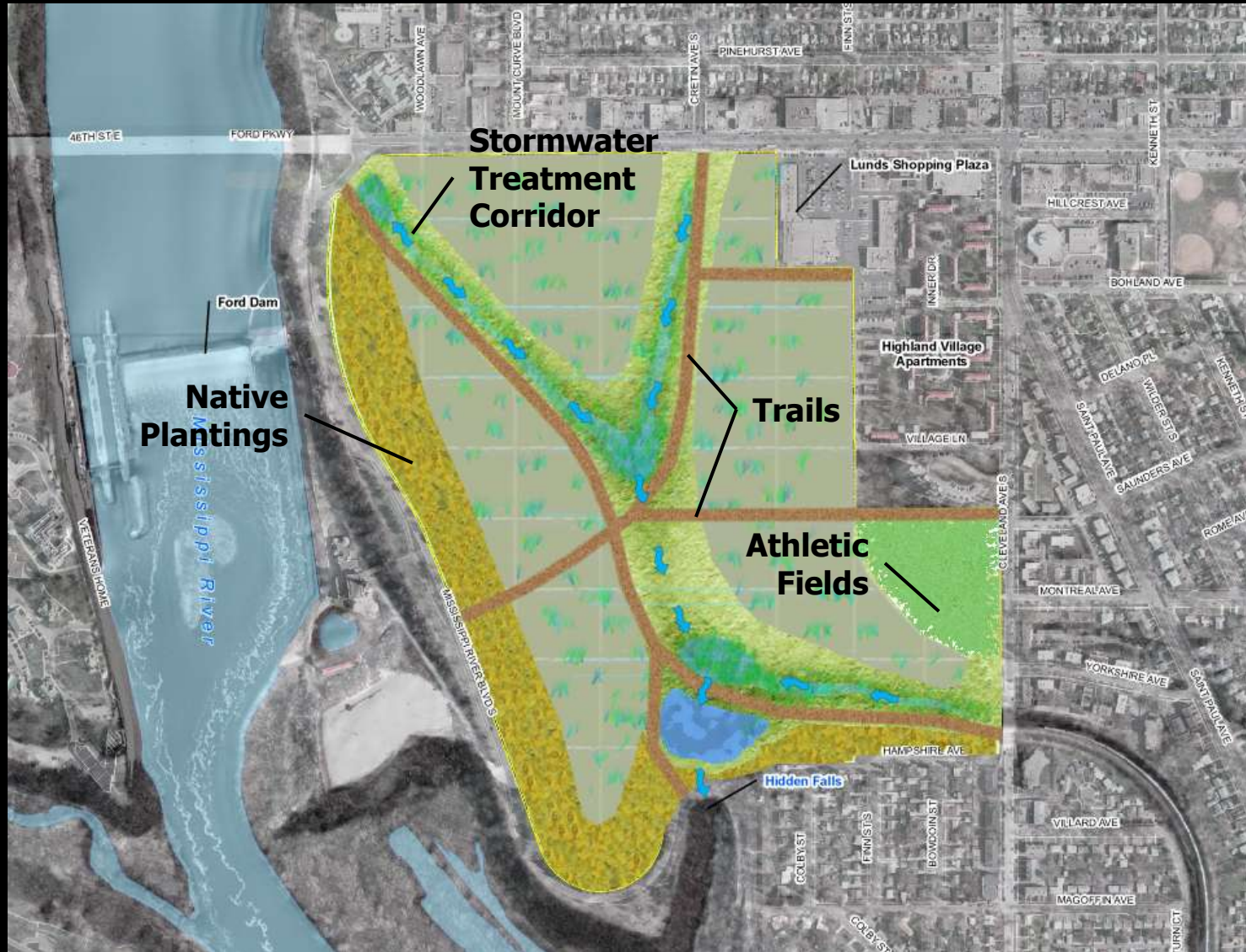


Daylighting Historic Stream



Source: Capitol Region WD

Integrated treatment system treats stormwater and provides a multifunctional corridor



Conservation Design Process helps identify locations for infiltration



Integrated treatment system treats stormwater and provides a multifunctional corridor



photo by Pete Musty - April 22, 2010 - NUN

Integrated treatment system treats stormwater and provides a multifunctional corridor

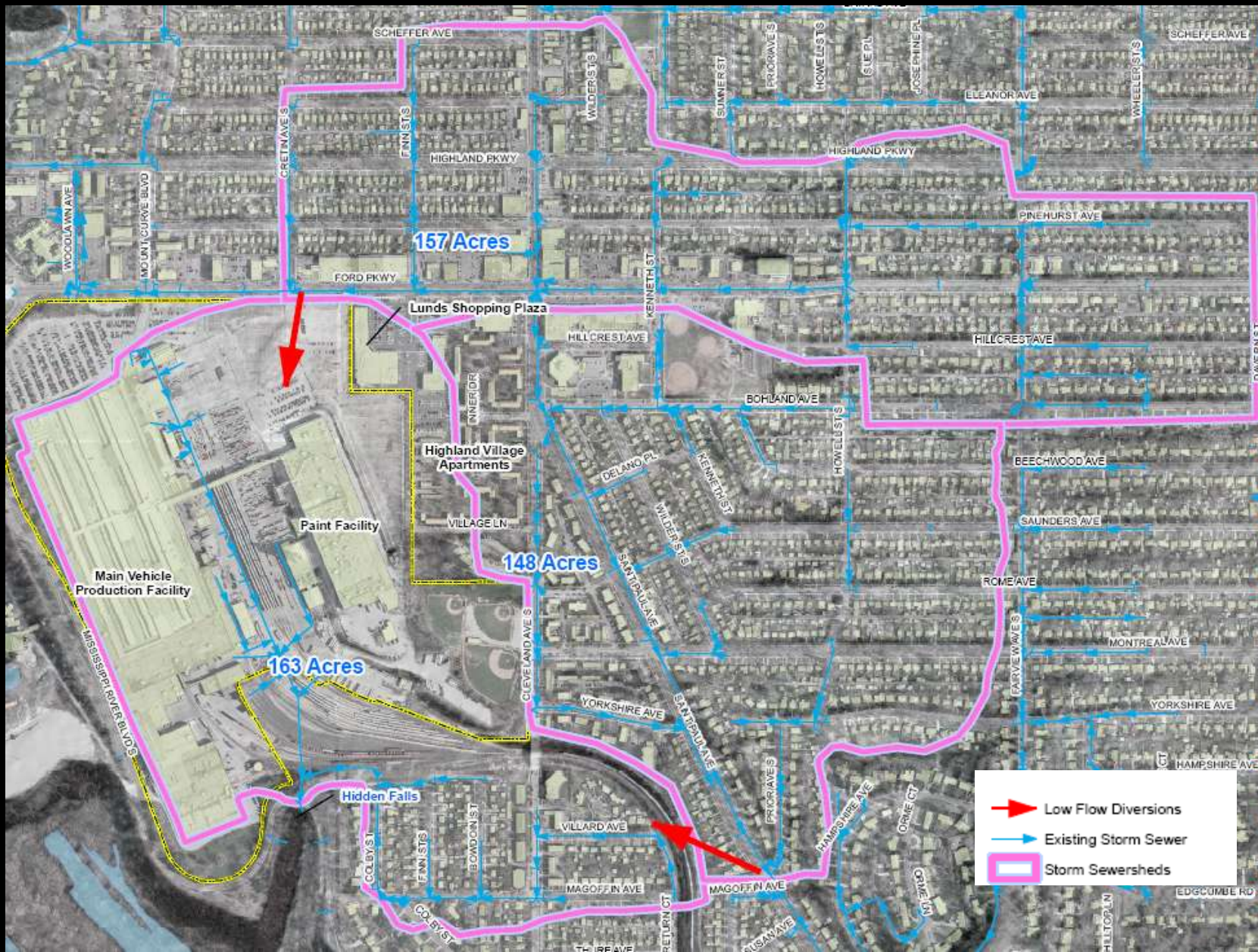


Integrated treatment system treats stormwater and provides neighborhood amenities

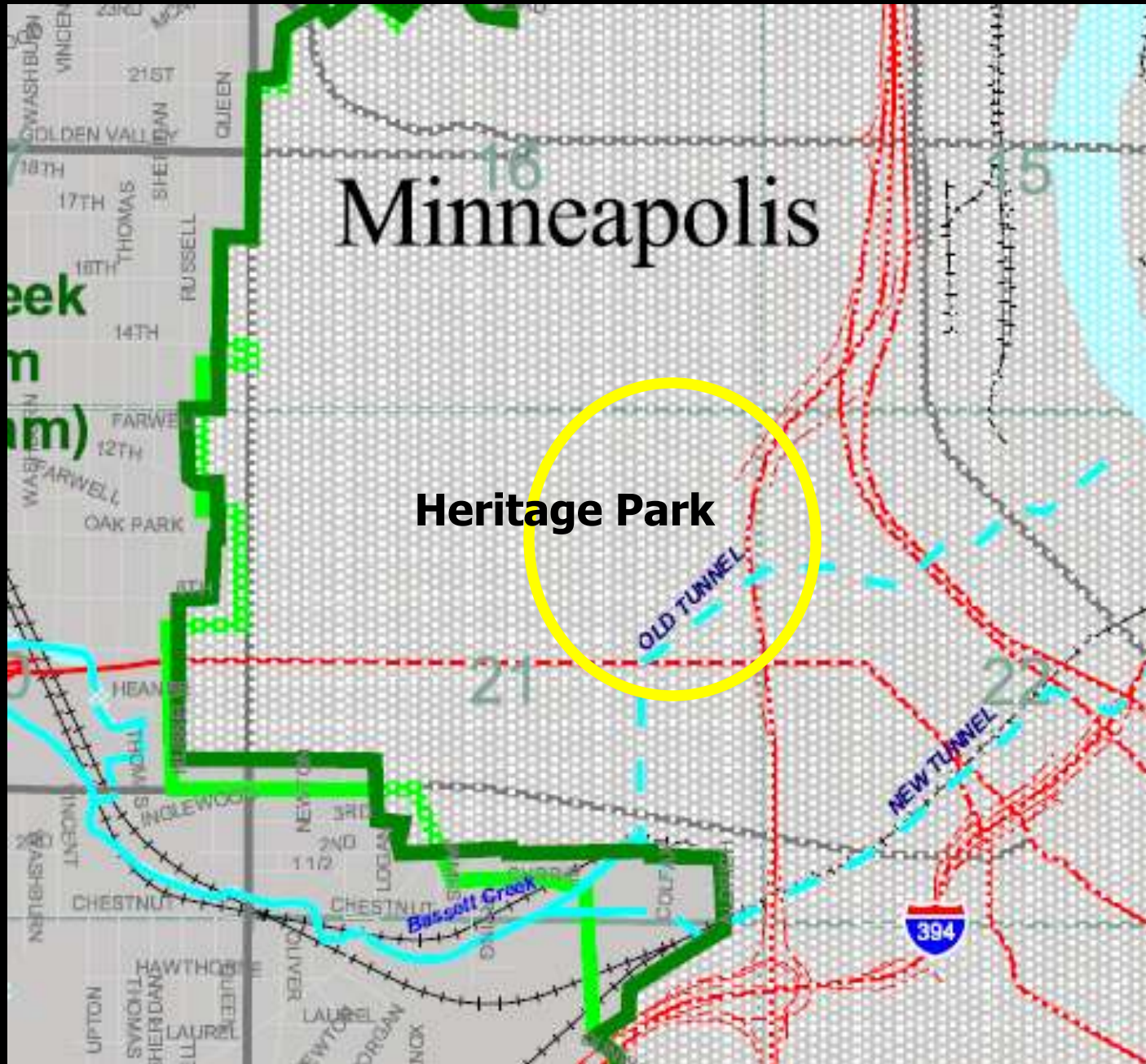
Promote pedestrian/bike-friendly spaces



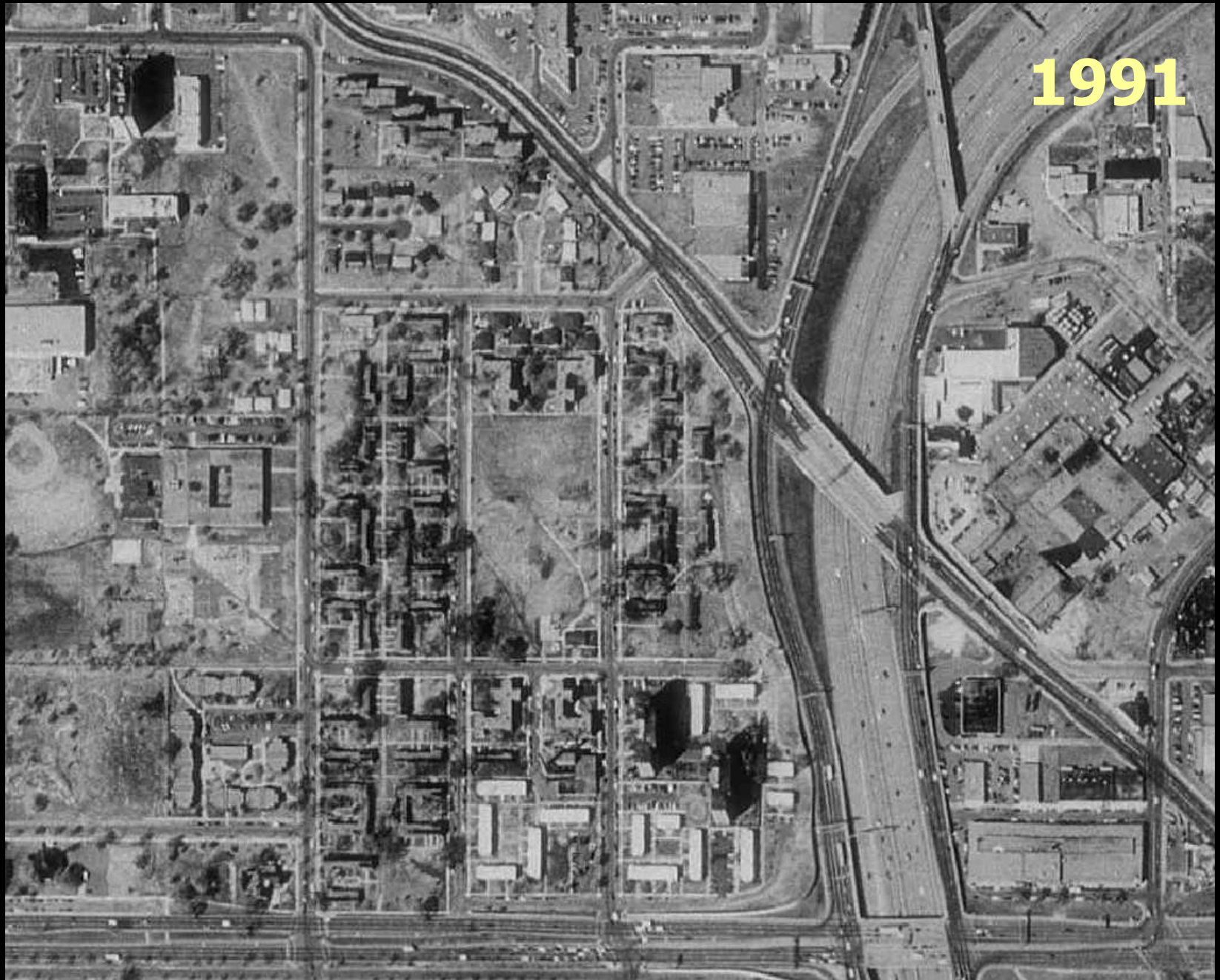
Redevelopment creates opportunities to treat stormwater from surrounding neighborhood



Case Study: Heritage Park



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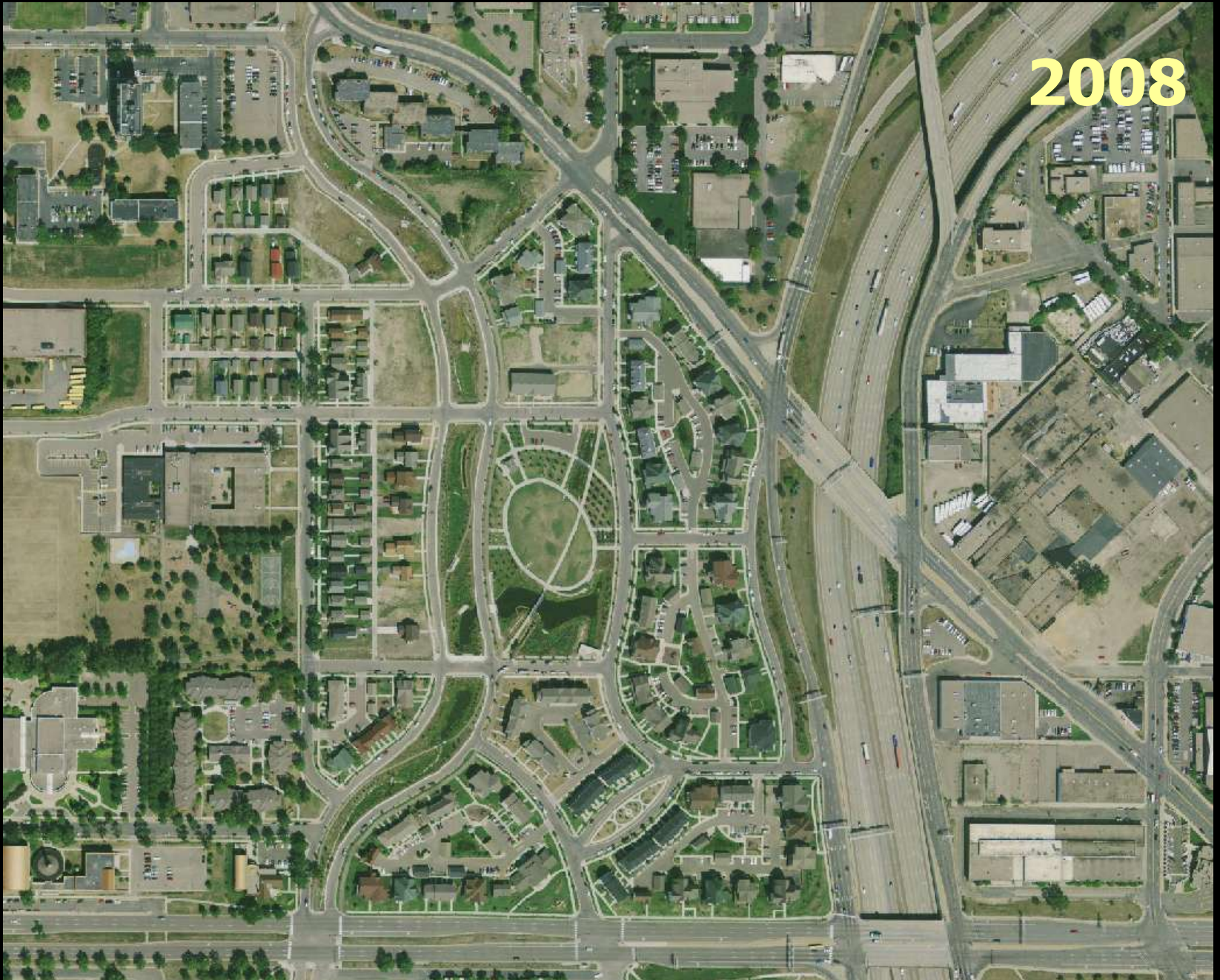


Case Study: Heritage Park



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2008



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Questions?



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